Exhibit 15

Truckee River Operations Model

Operations Criteria and Analysis for

Current Conditions and Alternatives

REVIEW OF RESERVOIR AND RIVER OPERATION ANALYSIS PROCEDURES APPLIED TO TROA EIS/EIR ALTERNATIVES

This discussion is intended to provide a general review of assumptions made and procedures used to "operate" the Truckee River in a manner that incorporates the basic operation principles applied to Current Conditions, future No Action conditions, future conditions with supplemental (other than TROA) Local M&I Water Supplies and future conditions with TROA. It is intended that this discussion will provide information to help explain analysis assumptions and operation characteristics that are the basis for calculation of results, which were distributed for use in drafting the EIS/EIR.

The discussion is organized into the following sections:

Analysis Period
Lake Tahoe Basin Water Use
California Storage and Demand, Lake Tahoe to State Line
California In Stream Flow Requirements
California Reservoir Recreation
TMWA Demand, Water Rights and Water Supply
Water Quality Water Supply and TMWRF Groundwater Component
Truckee Meadows non-TMWA and non-Water Quality Demands
Fernley M&I Demand and Storage
Newlands Project
Lower Truckee River Fish, Including Cui-ui and LCT, and Pyramid Lake
Reservoir Storage and Release
Lake Tahoe Storage and Release
Donner Lake Storage and Release
Prosser Creek Reservoir Storage and Release
Independence Lake Storage and Release
Stampede Reservoir Storage and Release
Boca Reservoir Storage
Truckee River at Sparks and at Vista
Truckee River Inflow to Pyramid Lake

Analysis Period

Hydrologic conditions for a 100 year period were used to perform each analysis (Current Conditions, No Action, Local Water Supply and TROA). The basic climatic conditions for the 100 years are those that occurred during the historic period of 1901 through 2000.

Lake Tahoe Basin Water Use

The analysis treats California and Nevada water use in the Lake Tahoe basin as it is related to the water use under future conditions with TROA and with full development as provided in PL 101-618. The analysis does not perform any operation calculation for the Lake Tahoe basin. Impacts of water development are incorporated into the analysis by adjusting the 1901-2000 monthly net inflow data for Lake Tahoe. Because future development with the PL 101-618 water use provides the base, No Action, Local Water Supply and TROA analyses have no further adjustment to the Lake Tahoe inflow data.

The Current Conditions analysis recognizes that present water use is less than future water use and, to account for this, increases Lake Tahoe net inflow by 1,402 acre-feet per year.

California Storage and Demand, Lake Tahoe to State Line

California direct diversion annual demand for the Current Conditions analysis is set as 2,800 acre-feet from surface water and 7,573 acre-feet from groundwater. For No Action, annual surface water demand is set to 3,100 acre-feet and annual groundwater demand is set to 19,600 acre-feet. For the Local Water Supply Alternative and TROA, annual surface water demand is set to 4,300 acre-feet and annual groundwater demand is set to 18,400 acre-feet. These annual demand amounts were set by the California Department of Water Resources.

For the TROA analysis, it was estimated that California would exercise an additional surface water demand of 300 acre-feet per year which may be used to accumulate storage. The storage may be used to supply California's diversion demand during dry months or years. Up to 8,000 acre-feet of storage may be accumulated. The storage is accumulated in Lake Tahoe by reducing release that would otherwise be made and allocating water associated with a water right from the Truckee below Lake Tahoe to replace the water that would otherwise have been released from Lake Tahoe. By exchange, California water stored in Lake Tahoe may be transferred to another Truckee reservoir. This California storage is released proportionately to other credit water to maintain minimum reservoir releases.

California also stores up to 5,400 acre-feet per year of Joint Program Fish Credit in the TROA analysis. This water is stored in Truckee River reservoirs, may be accumulated in storage at a rate equal to the rate at which Fish Credit is accumulated and is stored (based upon the potential of surplus inflow to Pyramid Lake) in the same manner as Fish Credit is accumulated. California's Joint Program Fish Credit Water is transferred between reservoirs with an objective

of maintaining recreation pools. When no other supplies are available, it is used to maintain minimum releases.

California's surface water availability is based upon the availability of flow from the Truckee basin between Lake Tahoe and the California-Nevada state line. It is limited, as required in PL 101-618, to those times when supplies are adequate to supply Orr Ditch Claims #1 and #2 (belonging to the Pyramid Lake Paiute Tribe) and TMWA's 40 cfs right. The analysis makes no calculation regarding the impact of these limitations upon the 1,200 acre-feet of existing surface water diversion. Rather, the analysis assumes that those supply and physical characteristics associated with the location of existing diversions create limitations that regulate the diversion in accordance with requirements of PL 101-618.

For the two future conditions alternatives, California's additional surface water is diverted from the Truckee River at a location just below the point where Donner Creek flows into the Truckee River.

In the TROA analysis, release of Floriston Rate Water is not adjusted to compensate for reduction in flow associated with the increase in California's direct diversion or storage used in future conditions analyses unless the Truckee flow at Farad is significantly less than Floriston Rates.

California In Stream Flow Requirements

The criteria for minimum in stream flows under TROA are documented separately and will not be duplicated herein. Minimum reservoir releases for the non-TROA analyses are those that apply to present operations and are as follows:

Lake Tahoe	50 cfs October-March and 70 cfs April-September
Donner Lake	2 cfs min, 3 cfs max, and 5 cfs below Cold Creek
Prosser Reservoir	5 cfs
Independence Lake	2 cfs
Stampede Reservoir	30 cfs

No other instream flow requirements or objectives are used for the non-TROA analyses.

For the TROA analysis, operation uses seasonal forecasts to select releases during periods when releases can be maintained at rates greater than minimum. Releases greater than current minimums (see above listing) do not use Floriston Rate Water unless such Floriston Rate Water is being released for Orr Ditch Decree water right consumptive use purposes. Releases are selected with a "most desirable" target based upon Preferred Flows established by the California Department of Fish and Game. These Preferred Flow releases are as follows:

Lake Tahoe	250 cfs October-January 150 cfs Feb-March and August-Sept 300 cfs April-July
Donner Lake	50 cfs October-Jan and Apr-July 20 cfs February-March 10 cfs August-September
Martis Creek Lake	No preferred release
Prosser Reservoir	50 cfs October-January 35 cfs February-March 75 cfs April-July 30 cfs August-September
Independence Lake	20 cfs October-Jan and Apr-July 10 cfs Feb-March and August-Sept
Stampede Reservoir	125 cfs October-Jan and Apr-July 100 cfs Feb-March and August-Sept
Boca Reservoir	No preferred release

The TROA operation selects release based upon the opportunity and necessity to release (and at times restore) water during the upcoming season. For example, release greater than minimum may be provided in years when reservoir storage must be emptied to provide adequate flood control space.

The necessary release from storage is distributed over several months so that the release pattern will follow (as closely as practical) the pattern of Preferred Flow over the period. For example, in the case of the analysis selecting a Stampede Reservoir release schedule for July through October, the release would be selected in recognition of the Preferred Flow pattern which is 125 cfs during July, 100 cfs during August and September and 125 cfs during October.

The TROA analysis procedure for establishing target flows varies with time of year, as follows:

- During October through January, release targets are adjusted to equal minimum flows.
- During February through May, the ability to supply flows from the analysis month through June that are between minimum and preferred is calculated. Each month the release target is set to equal the greater of minimum release or the flow target calculated by analyzing forecast flows.
- During June, release targets are set to minimums.
- During July through September, release targets were based upon release through October in conjunction with the minimum and preferred flows.

In addition under TROA conditions, minimum releases are set in accordance with Article Nine of TROA, which specifies and sets requirements for Enhanced Minimum Releases.

It should be noted that while TROA seasonal release scheduling analysis may select a minimum release target, the calculated release may be significantly greater because of other operational objectives. The existence of such other operation objectives is the primary reason it is convenient for the analysis to always set June target release to the minimum.

California Reservoir Recreation

No recreation pool objectives were established for the non-TROA analyses. For the TROA analysis, May 31 through August 31 reservoir storage objectives were as follows:

Lake Tahoe	None
Donner Lake	8,800 acre-feet
Prosser Reservoir	19,000 acre-feet
Independence Lake	10,500 acre-feet
Stampede Reservoir	127,000 acre-feet
Boca Reservoir	33,500 acre-feet

Achievement of the recreation storage objectives is not allowed to impair operation to supply Enhanced Minimum Releases.

These objectives were used to manage Joint Program Fish Credit under TROA conditions.

Under TROA conditions for Independence Lake, Fish Credit Water and Fish Water may be used along with Joint Program Fish Credit in order to maintain the target storage.

Under TROA conditions, the Prosser Creek Reservoir recreation storage management is more complex than that of other reservoirs and it relies more heavily upon storage classifications other than Joint Program Fish Credit. In certain years, Prosser Creek Reservoir will maintain its storage equal to its target when Stampede and Boca drop below their storage targets.

Under TROA conditions, Donner Lake releases for in stream flow were restricted somewhat in an effort to maintain the recreation storage objective.

TMWA Demand, Water Rights and Water Supply

TMWA's surface water rights used in all three analyses included TMWA's rights to Hunter Creek and TMWA's 40 cfs right for direct diversion from the Truckee River. The current and future conditions studies assumed that TMWA demands and use of former agricultural Truckee River water rights would be as follows:

	Demand (ac-ft)	Former Agricultural Water Rights (ac-ft)
Current Conditions	83,140	57,170
No Action	119,000	83,030
Local Water Supply	119,000	83,030
TROA	119,000	93,550

Over the 100 year analysis period, demands listed above result in the following average annual utilization of TMWA's water supplies:

	Current Conditions Analysis (ac-ft)	No Action Analysis (ac-ft)	Local Water Supply Analysis (ac-ft)	TROA Analysis (ac-ft)
Annual Demand	83,140	119,000	119,000	119,000
Conservation (short)	None	590	330	740
Hunter Creek	5,320	5,320	5,320	5,320
T.M. Groundwater	15,360	13,310	13,320	12,810
TMWA's 40 cfs	28,310	28,690	28,690	28,690
Former Agric. Rts.	33,480	70,280	70,250	69,820
Donner/Indepen L	450	500	530	730
Additnl Grndwtr Sto	None	None	280	None
M & I Credit Stor	210	310	300	890

Conservation (or shortage in supply) changes between studies. Under Current Conditions, all demand can be met even during a drought equal to that of 1992. Therefore, there is no conservation indicated for the Current Conditions analysis.

No Action and Local Water Supply alternatives have less conservation that does TROA because TROA requires conservation in any year classified as a Drought Situation. In some years when TROA has conservation, TMWA may experience only a small shortfall in its normal supply or may not experience any shortage in supply. No Action and Local Water Supply alternatives use conservation only when there is a direct impact upon TMWA's ability to maintain its reserve storage (for dry years). During the driest years, the No Action alternative's conservation (or shortage) is greater than calculated for other alternatives. It is as much as 10,580 acre-feet per year or nine percent of normal year supply and demand.

Hunter Creek supply is fully utilized in all analyses.

Truckee Meadows Groundwater for the Current Conditions analysis is utilized during normal water supply years at a level which corresponds to the that used in 2002. This is greater than the planned average use in the future. Thus, the current conditions average use of groundwater exceeds the normal year use that calculated for the other alternatives. However, the No Action and Local Water Supply alternatives pump more groundwater during dry years.

TMWA's 40 cfs Diversion Right is a right to direct diversion from the Truckee River. This right is utilized throughout the year in all analyses.

Former Agricultural Water Rights have been and are being acquired in conjunction with M & I development within the TMWA service area. The use of these rights is based upon demand and the impact of demand is reflected in the difference between the current and future analyses. The TROA analysis shows slightly lower utilization of these rights because of the greater conservation under TROA, as discussed above.

Donner and Independence Lakes both provide Privately Owned Stored Water (POSW) to TMWA. All analyses reflect the present sharing of Donner Lake between TMWA and the Truckee Carson Irrigation District.

Use of Donner Lake is significantly constrained by requirements to maintain lake level in the summer and to empty all operational storage in the fall and winter.

The TROA analysis uses somewhat more water from Donner and Independence Lakes than do the other alternatives because, under TROA, TMWA is required to use their POSW supply before using any M & I Credit storage.

Additional Groundwater Storage is included in the analysis of the Local Water Supply alternative. This groundwater reservoir is operated as a recharge groundwater reservoir that is filled during normal water supply periods using TMWA's water from Donner Lake, Independence Lake, and the consumptive use portion of TMWA's water rights that are not directly used to supply an immediate demand. The groundwater reservoir is used to supply TMWA when Truckee River flows are insufficient to supply TMWA's direct diversion rights (former agricultural rights and 40 cfs right).

M & I Credit Water storage is utilized in the each analysis. Under TROA, the storage is available in Lake Tahoe, Prosser Reservoir, Stampede Reservoir, and Boca Reservoir. Under the other alternatives, M&I Credit Water storage is available in Stampede and Boca Reservoirs in accordance with the Interim Storage Agreement. The storage is filled during normal water supply periods using TMWA's water from Donner Lake, Independence Lake, and, under TROA conditions, the consumptive use portion of TMWA's water rights that are not directly used to supply an immediate demand. Under non-TROA conditions, the M&I Credit Water storage is used during dry years when TMWA's direct diversion water rights provide an insufficient M&I supply. For TROA, M & I Credit Water storage is used during a Drought Situation and only after all of TMWA's available Donner Lake storage and all Independence Lake storage above 7,500 ac-ft as well as the supply from TMWA's direct diversion rights have been used.

Water Quality Water Supply, Utilization and TMWRF Groundwater Component

There are no water quality considerations applied to the Current Conditions operation analysis.

Future conditions (with and without TROA) operation includes operation in accordance with the water quality agreement among Reno, Sparks, Washoe County, Pyramid Lake Paiute Tribe and federal government. This agreement provides for acquisition of water rights and utilization of that supply to improve Truckee River water quality by increasing Truckee River flow and the river's consequent capacity to assimilate nutrients. The water rights acquired are as follows:

Truckee River between Farad and Vista: Under TROA, 7,600 acre-feet of water rights and, without TROA, 900 acre-feet of water rights are acquired: Acquisition of these rights is assumed to increase Truckee River flow by 62.5% of the acquired rights or diversion, whichever is less. The 62.5% portion can be stored in Truckee River reservoirs. (62.5% is considered to represent the consumptive use portion of these water rights.)

Of the 7,600 acre-feet under TROA, 6,700 acre-feet are the "groundwater component" which is acquired in accordance with Section 1.E.4 of TROA.

Truckee River between Vista and Derby Dam: 1,500 acre-feet of water rights are acquired: The acquisition of these rights is assumed to increase Truckee River flow by 970 acre-feet or a proportionate share of diversion, whichever is less. The increased Truckee River flow is not stored in Truckee River reservoirs. It remains in the Truckee and flows to Pyramid Lake. (970 acre-feet are considered to represent the consumptive use portion of these water rights.)

Truckee Division of the Newlands Project: 10,300 acre-feet of water rights are acquired: When other Newlands Project rights are fully supplied (in accordance with OCAP), acquisition of these rights is assumed to increase Truckee River flow (available based upon water that would be left in Truckee at Derby) by 133% of the acquired rights or supply, whichever is less. The 133% portion can be stored in Truckee River reservoirs. (133% is considered to represent the head gate right plus Newlands Project system loss which, when taken together, represent the
impact upon Truckee River flow associated with these rights.)

Water associated with acquired water rights can be stored whenever reservoir release can be reduced without impairing release for Enhanced Minimum flows or flood control operation, provided that the resulting change in Truckee River flows does not impair utilization of other Truckee River water rights and such changes in Truckee River flows are not adverse to the water quality objectives. (For the non-TROA alternatives, such storage accumulation may not impair the supply of flow necessary to meet Floriston Rates.)

Also, the water associated with acquired water rights can be exchanged into storage to the extent that water provided by such water rights can replace a release of federal project water that would otherwise have been made to support fish populations in the lower Truckee River.

Water quality storage is released to maintain June through September Truckee River flow in the reach of the Truckee from the discharge of the TMWRF (Reno/Sparks sewage treatment)

plant to Pyramid Lake. Target Truckee River flows are selected each of the four months based upon desired flows in the Truckee, upon Truckee River flow without release of water quality storage and upon the amount of storage that is available for use during the current season. The operation does not attempt to provide season to season carry-over of water quality storage but, such carry-over is provided in some years when it is not necessary to release all water in storage.

Target flows used to set release of water quality storage apply during the months of June through September and are 275 cfs for the Truckee River at Sparks and 135 cfs for the Truckee River between Derby Dam and Pyramid Lake.

Truckee Meadows non-TMWA and non-Water Quality Demands

Other than TMWA and water quality, there are substantial demands for Truckee River water from the reach between Farad and Derby Dam that currently exist and will exist in the future. These demands receive their water supply from water rights established in the Orr Ditch decree. The analyses treat these demands as irrigation demands and the demands are distributed through the season in accordance with a monthly irrigation schedule. These rights have the same basis as the Former Agricultural water rights acquired by TMWA and that will be acquired for water quality purposes. As M & I demand grows, the number of rights associated with other uses will decrease and the annual demand associated with these rights will also decrease. Demands and diversions associated with these rights are as follows:

		Annual Demand	Average Annual Diversion
Current Conditions	(ac-ft)	40,770	39,170
No Action and Local Water Supply Alternative	(ac-ft)	21,500	20,720
TROA	(ac-ft)	4,860	4,690

The change in water allocation characteristic is reflected in the above amounts. Both future analyses reflect the acquisition of water rights to supply M & I demand and to supply water for water quality purposes.

Fernley M&I Demand and Storage

For all alternatives except Current Conditions, Fernley M&I demand is set as 6,800 acre-feet per year. This demand is supplied using 6,800 acre-feet of water rights assumed to have been acquired and transferred from the Truckee Division. During normal water supply years, acquisition and transfer of these water rights results in a reduction in Truckee Division demand and consequent diversion from the Truckee River to serve the Newlands Project of 9,070 acre-feet.

Under TROA, it is assumed to be possible for Fernley to establish and use Credit Water storage. However, since the annual demand is equal to the water right acquisition, there is no

water available for establishment of Credit Water storage and, consequently, there is no Fernley M&I Credit Water storage operation in any of the alternatives.

Newlands Project

The Newlands Project (TCID) is subdivided into two divisions. The Truckee Division receives water directly from the Truckee Canal and, consequently, directly from the Truckee River. The Carson Division receives water from Lahontan Reservoir, which is filled by the Carson River and by diversion from the Truckee River through the Truckee Canal. Diversion through the Truckee Canal to supply Lahontan and the Carson Division is controlled by OCAP. The rules and regulations associated with OCAP are those established in 1997 and are not addressed herein.

Newlands Project demands differ between the current conditions and the future conditions analyses. Demands and supplies calculated for each analysis are as follows:

	Current Conditions Analysis (ac-ft)	No Action Analysis (ac-ft)	Local Water Supply Analysis (ac-ft)	TROA Analysis (ac-ft)
Demands:				
Truckee Division	18,520	0	0	0
Carson Division	275,720	268,870	268,870	268,870
Average Annual Supply:				
Truckee Division	18,070	0	0	0
Carson Division	269,410	260,720	260,610	260,690
Average Annual Shortage:				
Truckee Division	450	0	0	0
Carson Division	6,310	8,150	8,260	8,180

All future conditions analyses reduce the Newlands Project supplies (both in quantity and as a percent of demand) as compared to Current Conditions. This can be attributed to several factors. Some of the more significant factors are as follows:

- Assumed future acquisition of Newlands Project rights and the transfer of such rights to other uses reduce Newlands Project demand from Current Conditions, as shown by the above "Demands" item.
- California and Nevada water use in the Lake Tahoe basin increases with a consequent reduction in supply available to Truckee River water users.
- California water use from the Truckee basin below Lake Tahoe increases with a consequent reduction in supply available to Nevada.
- Utilization of Orr Ditch decree water rights (including Claim No. 1 and No. 2) increases with a consequent reduction in the proportionate supply to each water right.

- Utilization of reservoir storage in Independence and Donner Lakes increases with a consequent reduction in the amount of water available for direct diversion from the Truckee.

Water utilization indicated by the above list also varies between the non-TROA analysis and the TROA analysis. Such variations (as listed above) produce the relatively small (when compared to the change from Current Conditions) differences between supplies for the future non-TROA alternative studies.

Lower Truckee River

Between Derby Dam and Pyramid Lake, water is currently used for irrigation and in the future will also be used as an M&I supply. The future conditions analyses include both an M&I demand and a larger irrigation water demand than included in the Current Conditions analysis. The increased demand is based upon anticipated full utilization of Orr Ditch decree Claims No. 1 and No. 2. Other Orr Ditch Decree water rights also provide for diversion from the lower Truckee River. Assumed diversions from the lower Truckee for each analysis are as follows:

	Current Conditions Analysis (ac-ft)	No Action, LWSA and TROA Analysis (ac-ft)
Irrigation Diversion Demand	12,040	17,900
M&I Demand	None	16,380

Lower Truckee River Fish, including Cui-ui and LCT, and Pyramid Lake

For each analysis, management of flows in the lower Truckee River was based upon a set of monthly target flows. The monthly target flows were drawn from six flow regimes and a regime was selected each month based upon a water supply forecast or the flow regime used for the previous month.

The average annual inflow to Pyramid Lake for each alternative is as follows:

Current Conditions	496,720 acre-feet/year
No Action Future	489,580 acre-feet/year
Local Water Supply Future	488,650 acre-feet/year
TROA	500,710 acre-feet/year

Comparison of Current Conditions to TROA indicates that TROA provides additional inflow to Pyramid Lake of about 4,000 acre-feet per year. This is primarily due to the acquisition of water rights and the dedication of much of the yield from those rights to

uses that provide inflow to Pyramid Lake. In addition, acquisition of the rights causes a reduction of irrigation and consumptive use associated with irrigation.

Comparison of No Action and Local Water Supply Alternatives to TROA indicates that TROA provides additional inflow to Pyramid Lake of about 11,000 acre-feet per year. This is primarily due to the greater acquisition of water rights under TROA conditions. As indicated above, such water rights are dedicated to uses that provide inflow to Pyramid Lake. And, as indicated above, such acquisition of the rights causes a reduction of irrigation and consumptive use associated with irrigation.

Comparison of Current Conditions to No Action and Local Water Supply Alternatives indicates that non-TROA future conditions produce about a 7,000 acre-foot reduction in average inflow to Pyramid Lake. While the No Action and Local Water Supply alternatives involve the acquisition of water rights and the consequent reduction in irrigation and increase in water rights dedicated to provide inflow to Pyramid Lake, for these non-TROA future alternatives, the conditions that provide increases to Pyramid Lake inflow are not large enough to overcome the impact of greater Truckee Meadows consumptive use associated with future conditions.

Additional discussion of impacts upon lower Truckee flow is provided in the section "Truckee River Inflow to Pyramid Lake".

Reservoir Storage and Release

Reservoir storage and release are discussed together because things that impact one also impact the other. These comments are directed primarily to the probability curves for storage and release. The discussion also uses information contained in some of the storage and release tables that have been prepared for use in the EIS/EIR analysis

Lake Tahoe Storage and Release

Storage-probability curves for the end of August indicate that generally the end of August Lake Tahoe storage changes only very modestly between analyses. There is a small tendency for TROA storage to be less than other alternatives and a somewhat greater tendency for Current Conditions storage to be greater than other alternatives. A primary reason that Current Conditions shows the greater storage is that Tahoe Basin water use is smaller than estimated future use. When TROA is compared to No Action and Local Water Supply storage, the storage of credit water under TROA tends to increase Lake Tahoe storage and the spring release of water in exchange for storage in Stampede Reservoir tends to reduce Lake Tahoe storage.

October-January flow probability curves indicate that TROA has generally lower Lake Tahoe release than do the other alternatives. Much of this difference occurs during October. November through January flows are much more similar. Under TROA during October, establishment of credit storage in Lake Tahoe results in lower release and, during October,

Floriston Rate demand is partially supplied by release from Stampede Reservoir. Such October release from Stampede results from previous (during the season) exchange of Lake Tahoe Floriston Rate storage into Stampede.

The flow probability tables show that the October 50% exceedence release from Tahoe for Current Conditions is 194 cfs and for TROA is 113 cfs. By January, the 50% exceedence release for Current Conditions is 196 cfs and the TROA release is 146 cfs.

The TROA alternative provides Enhanced Minimum release of 75 cfs about 20% of the time, with about 5% of the time being greater release with TROA.

February-March flow probability plots indicate that, under TROA, flows are maintained at 75 cfs about 10% more than they are under other alternatives. This results from the opportunity to make such additional release using credit in Lake Tahoe. (Such additional releases are made when the release can be matched by an accumulation of storage in another reservoir.) Under TROA, release drops below 50 cfs slightly more often. This results from a few dry year cases when storage in Lake Tahoe is less under TROA conditions.

The reduced dry year storage results primarily from two characteristics of operation under TROA.

1. One characteristic is the exchange of Floriston Rate storage from Lake Tahoe to Stampede and the associated increase in release from Lake Tahoe used to provide inflow to Pyramid Lake. Occasionally this extra release from Lake Tahoe coincides with a season when Floriston Rates are supplied from Lake Tahoe storage before being supplied from Boca storage and shortly thereafter Lake Tahoe drops so low that minimum release cannot be maintained. In such case, the Lake Tahoe the release (for exchange with Stampede storage) under TROA is greater than the corresponding non-TROA release. Thus, the TROA storage in Lake Tahoe is less than the non-TROA storage. That results in TROA release being restricted (by Tahoe elevation) before the non-TROA release is restricted by Tahoe elevation and the TROA release will be less than the non-TROA release.

2. The second characteristic of TROA operation is that occasionally, during the period when Lake Tahoe is the first reservoir used to supply Floriston Rates, the presence of credit storage in Lake Tahoe increase discharge capacity as compared to the non-TROA operation. That increased discharge capacity means that Tahoe release of Floriston Rate water is increased (as compared to the non-TROA operation) and consequently, the Tahoe Floriston Rate Water storage under TROA is reduced. When a subsequent month has enough inflow to reduce Floriston Rate Water demand on Lake Tahoe, the credit storage is released. Then, in subsequent months (as Lake Tahoe drops to its rim elevation) the storage is less than non-TROA storage and the release capacity is less than non-TROA release capacity.

April-July flow probability plots indicate the TROA operation will frequently provide greater release from Lake Tahoe than will other alternatives. This is primarily the result of credit water being release to support spawning of cui-ui, to supply 75 cfs, which is the Enhanced

Minimum release and to exchange Floriston Rate storage from Lake Tahoe into Stampede Reservoir. It may be noted that this release of credit water from Lake Tahoe and the exchange into Stampede Reservoir both support cui-ui spawning in the lower Truckee River and both reduce the necessity for large releases from Stampede Reservoir.

There is relatively little difference between the flow-probability plots for non-TROA operations.

August-September flow probability plots indicate that (i) about 10 to 15 percent of the time, TROA operation provides the Enhanced Minimum release of 75 cfs when non-TROA operation is providing only the 70 cfs Minimum release, (ii) during about 50% of the time, TROA has a lower release than non-TROA operation. This reduced release under TROA is primarily related to (i) reduction in release associated with establishment of Credit Water storage under TROA and (ii) reduced Tahoe release of Floriston Rate Water because, under TROA, this is the period when Stampede Reservoir begins releasing the Lake Tahoe Floriston Rate Water that was exchanged to Stampede Reservoir during the spring months.

Donner Lake Storage and Release

Storage-probability curves for Donner Lake indicate that the non-TROA operation results in greater storage at the end of August than does TROA operation. This results from several factors. First under TROA, the minimum release requirements necessitate larger releases. Second under TROA, the opportunity and necessity to use Donner Lake water is larger than under non-TROA operation. And third, under TROA, the fall draw down of storage is planned with the objective of holding release through September to no more than the Preferred Release rate. The impact of this TROA operation criteria is illustrated by both the storage-probability curve and the August-September release probability curve.

However, it should be noted that when Current Conditions storages or other alternative storages calculated for the end of August are compared to storage recorded during recent years, the calculated storage is greater than recently observed storage. This occurs because, under present operation, there are few formal criteria for operation of Donner Lake and, in the calculations for this investigation, Donner Lake storage was maintained until a release was required. Consequently, the non-TROA storages reflected in the storage-probability curve probably are greater than would be expected from actual operation. Under TROA, the rules of TROA provide considerable direction for Donner Lake operation and, as a consequence, actual operation under TROA will, probably, more closely track the storages indicated by the storage-probability curve.

To illustrate the comparison of observed end of August storage to those summarized by the storage-probability curves, the following lists observed and calculated end of August storages during the ten years from 1991 through 2000.

End of August Donner Lake Storage

	Observed (ac-ft)	Current Conditions (ac-ft)	TROA (ac-ft)
1991	6,270	7,600	7,500
1992	5,570	6,560	6,490
1993	8,880	9,060	8,910
1994	6,240	6,610	6,540
1995	8,320	9,410	9,240
1996	8,290	8,780	8,500
1997	8,580	8,920	8,310
1998	9,000	9,220	9,040
1999	8,490	9,450	8,970
2000	7,630	8,440	8,070

During these ten years, the Current Conditions storage averages 678 acre-feet more than the observed storage and the TROA storage averages 430 acre-feet more than the observed storage. In terms of lake elevation, Current Conditions lake elevation averages 0.77 feet higher than observed lake elevation and TROA lake elevation averages 0.51 feet higher than observed lake elevation.

October-January flow probability curves indicate that releases under TROA would tend to be greater than operation under the non-TROA conditions. This difference occurs primarily during the month of October. During October, the TROA operation releases water from Donner to provide an exchange that results in establishment of M&I Credit in other Truckee River Reservoirs. This establishment of M&I Credit is much less than under non-TROA operations.

February-March flow probability curves indicate that releases under all alternatives are the same.

Donner Lake release is essentially unregulated from mid-November through early April. Thus, release patterns calculated by these monthly operation analyses tend to under represent the variability of Donner Lake release during this period. However, there is no difference between analyses and so no bias is introduced by the operation calculations.

April-July flow probability curves indicate that about 35% of the time TROA operation provides more release from Donner Lake. This reflects the greater requirements for in stream flows used in TROA and occurs primarily during the months of June and July.

As would be expected from the above comparison of observed August Donner Lake storage to calculated Donner Lake storage, the ten year (1991-2000) average observed July release from Donner Lake is about 8.5 cfs greater than the average release calculated for Current Conditions. Similarly, the ten year (1991-2000) average observed July release is about seven cfs greater than the average calculated for TROA conditions.

August-September flow probability curves indicate that about 55 percent of the time, TROA releases are greater than the non-TROA releases. This primarily reflects the greater in stream flow requirements under TROA.

The low flow portion of the flow probability curves (exceedence probability greater than 50%) represents release during August and the high flow portion (exceedence probability less than 50%) represents release during September. The September release under TROA is almost always equal to the Preferred Release rate of 10 cfs. Under the non-TROA operations, the September release is greater because there is a greater amount of storage that must be released before early November (see the August storage-probability curves).

Prosser Creek Reservoir Storage and Release

Storage-probability curves for the end of August show the greatest storage for TROA, the next greatest storage for No Action and Local Water Supply and the least storage for Current Conditions.

The reason that No Action and Local Water Supply alternatives have greater end of August storage than Current Conditions is related to the greater Newlands Project demand under Current Conditions. On average, the supply to Lahontan Reservoir under Current Conditions is about 9,000 acre-feet per year more than the supply for the other alternatives. This additional Newlands Project demand increases the demand for Prosser Creek stream flow and reduces the opportunity to store Prosser Creek water in Prosser Creek Reservoir.

The TROA storage is normally greater than calculated for other conditions. TROA storage is greater because it includes numerous categories of water storage in Prosser and because operation considers recreation objectives. The combination of storing credit waters and operation of Project Water to help achieve recreation objectives provides greater end of August storage than any other alternative. It may be noted that the TROA operation storage achieves the basic recreation objective of 19,000 acre-feet about 70% of the years.

October-January flow probability curves indicate that generally the release under TROA is slightly greater than under the other alternatives and that release under Current Conditions is slightly less than under other alternatives. This pattern reflects the greater August storage under TROA and the least August storage under Current Conditions. All Prosser storage above 9,800 acre-feet must be released by the end of October. Thus, to the extent an alternative has greater August storage, it is very likely that the September and October release will be greater.

February-March flow probability curves indicate that all alternatives provide similar release from Prosser. Current Conditions has a small tendency to have lower release, reflecting the tendency for carry-over storage to be less. Note the above discussion of the impact of Carson Division demand upon storage in Prosser Creek Reservoir.

April-July flow probability curves demonstrate four characteristics:

(i) About 10 percent of the time and during low flow release periods, TROA provides greater release. These conditions occur during July when TROA release is set to supply the Enhanced Minimum.

(ii) During 90 percent of the time, TROA release is less than that of other alternatives. This reflects the TROA operation to provide storage for lake-based recreation during the summer.

(iii) Current Conditions release is greater than No Action and Local Water Supply and, during 90% of the time, is greater than TROA. This is the result of the greater Newlands Project demand requiring greater release of Prosser Creek inflow to the reservoir.

August-September flow probability curves indicate that about 95% of the time, TROA release is greater than calculated for the other alternatives. The five percent when non-TROA alternatives are greater occur during August when a Prosser release is used to supply the target inflow to Pyramid Lake. The 95% of the time when TROA release is greatest are associated with (i) releases made to supply Enhanced Minimum Release targets and (ii) September release necessary to empty the greater TROA storage by the time storage must be drawn down to 9,800 acre-feet (end of October for flood control purposes).

Independence Lake Storage and Release

Storage-probability curves for the end of August indicate that generally Independence lake is lower under TROA operation than for other alternatives. This occurs primarily because, under TROA, releases are made to satisfy significantly greater in stream flow objectives and to release storage for re-storage as M&I Credit in a downstream reservoir. Storage is released for re-storage as M&I Credit in all alternatives, but under TROA, the California Guidelines encourage such release on pattern that is more beneficial for in stream flow purposes. Consequently, such release for re-storage tends to be greater during August under TROA conditions.

October-January flow probability shows all alternatives have similar release characteristics. The lowest flows tend to be slightly greater for TROA. This is due to TROA using greater Minimum Flow targets and, in some cases, to release of storage for re-storage as M&I Credit in a downstream reservoir.

February-March flow probability shows all alternatives have similar release characteristics. TROA release is sometimes greater due to either (i) greater minimum target release or (ii) early seasonal release during years when Independence will fill and early release of some water may help make the seasonal release pattern more uniform.

April-July flow probability curves show that all alternatives have similar release characteristics. TROA release is sometimes greater due to either (i) greater minimum target release or (ii) release of storage for re-storage as M&I Credit Water.

August-September flow probability curves show that about 30% of the time, TROA release is greater than the other alternatives and about 40% of the time TROA release is less than

the other alternatives. Under TROA, the August-September release is patterned after the California Guidelines and is more uniform than under the non-TROA analyses. Thus, there is a tendency for TROA August release to be greater and TROA September release to be less than the other alternatives.

Stampede Reservoir Storage and Release

Storage-Probability curves for the end of August indicate that TROA provides greater storage than do the alternative operations. This is related to the substantial storage of credit and of Lake Tahoe Floriston Rate Water that was exchanged from Lake Tahoe during the preceding spring. Release of the Lake Tahoe Floriston Rate Water extends from August into October.

October-January flow probability curves indicate that TROA operation provides more frequent and more sustained release at the rate of the Enhanced Minimum Release (45 cfs). In addition to the release that provides the Enhanced Minimum Release, TROA operation provides greater release to supply Floriston Rate Water using the Lake Tahoe Floriston Rate Water that had been exchanged into Stampede and provides greater release (or spill) during October to pull the reservoir storage down to the flood control pool. TROA greater summer storage (as indicated by then August storage-probability curves) results in more years when reservoir storage must be released or spilled in order to provide the required flood control reservation in Stampede Reservoir.

February-March flow probability curves indicate that TROA operation provides greater release when it is near the Enhanced Minimum release target flow of 45 cfs. And about 60% of the time, when flows exceed the Enhanced Minimum, TROA release is less than the non-TROA release. This reduced release results from Establishment of Credit Water storage under TROA.

The flow probability curves do not indicate it but about five percent of the time, TROA release is greater than other alternatives. This high flow greater release results from greater spill that is produced by storage of Credit Water under TROA.

April-July flow probability curves indicate that TROA release differs from other alternatives due to (i) maintenance of 45 cfs Enhanced Minimum Release during about ten percent of the time and (ii) utilization of an exchange with Lake Tahoe Floriston Rate Water, which limits release to about 125 cfs (Preferred Release) about ten percent of the time.

As indicated for February-March, the flow probability curves do not indicate it but about five percent of the time, TROA release is greater than other alternatives. This high flow greater release results from greater spill that is produced by storage of Credit Water under TROA.

August-September flow probability curves indicate that TROA operation provides greater release than No Action and Local Water Supply alternatives throughout the flow range. The TROA release curve has a “flat spot” at 100 cfs when release is being limited to the Preferred Flow. The TROA release tendency to exceed other alternative’s release is primarily due to (i) operation to maintain the 45 cfs Enhanced Minimum Flow, (ii) operation to release Lake Tahoe

Floriston Rate Water that has been exchanged into Stampede Reservoir and (iii) operation to pull reservoir storage down to the flood control pool by the end of October. The Current Conditions release being greater than No Action and Local Water Supply releases results from operation to supply target Pyramid Lake inflows. Under No Action and Local Water Supply alternatives, the acquisition of Truckee Division Water rights and the transfer of such rights to Water Quality purposes provides water that can flow into Pyramid Lake (without intervening storage) during August and September. That reduces the demand on Stampede storage. In addition, the greater Newlands Project demand under Current Conditions slightly reduces the water that would otherwise flow to Pyramid Lake and that increases the demand on Stampede storage under the Current Conditions operation.

Boca Reservoir Storage

Storage-probability curves for the end of August indicate that about 60 percent of the time TROA provides greater storage in Boca and about 20 percent of the time TROA provides less storage in Boca. The periods when end of August Boca storage is greater under TROA are periods when Credit Water storage is maintained through the end of August. Periods when end of August Boca storage is less are periods when release of Tahoe-Prosser Exchange storage is delayed in order to maintain recreation storage levels in Prosser Reservoir. During such periods, the demand on Boca's Floriston Rate Water storage will be increased and, consequently, the end of August Boca storage will be reduced.

There are no in stream flow objectives that apply specifically to Boca Reservoir. Therefore, no release probability curves were prepared.

Truckee River at Sparks and at Vista

Some operation characteristics can be demonstrated by reviewing these two sets of flow-probability curves together.

October-January flow-probability curves for Sparks show a significant difference between Current Conditions and either No Action or Local Water Supply flows while those for Vista show a much smaller difference. The general characteristic of greater flow for Current Conditions is related to the lower demand associated with Current Conditions and with the reduction in Truckee River flow that occurs when Water Quality Credit Water is established (for the No Action and Local Water Supply alternatives).

The significant difference at Sparks reflects the substantial M & I diversion that will occur when M & I demand reaches 119,000 ac-ft per year (both No Action and Local Water Supply alternatives). All of the M & I demand is upstream from Sparks. The return flows from the M & I service area enter the Truckee between Sparks and Vista. When TMWA demand reaches 119,000 ac-ft per year, the October-January return flows through the TMWRF sewage treatment facility will exceed those flows associated with Current Conditions. Thus, the reduced diversion above Sparks produces relatively more Sparks flow under Current Conditions and the

increased TMWRF discharge to the Truckee under No Action and Local Water Supply alternatives contributes flow to Vista that makes the Current Conditions, No Action and Local Water Supply alternative flows much more equal.

TROA operation produces generally lower flows at both Sparks and Vista. This is primarily related to the accumulation of Credit Water storage in the Truckee River reservoirs during October through January. Under TROA, there is greater establishment of Credit Water storage (TMWA M&I, Fish, Fernley M&I and Water Quality) than the No Action and Local Water Supply establishment, which is limited to Water Quality Credit in Prosser and Stampede reservoirs only.

February-March flow probability curves for lower flows differ from one another in a pattern that is similar to the difference pattern for October-January. However, about forty percent of the time at higher flows TROA has greater flow than the other alternatives. The reasons for the differences during the lower flows between operations are essentially the same as the reasons presented for October-January flows. TROA flows are greater during higher flows because TROA generally has greater storage in reservoirs and such greater storage results in reservoir more reservoir spill during high runoff periods.

April-July flow probability curves show relations of the alternatives that are similar to those shown in February and March. The No Action and Local Water Supply alternatives tend to have less flow than the Current Conditions due to the lower diversion under Current Conditions. In the high flow portion of the curves, TROA tends to have greater flow than the other alternatives due to greater reservoir spill.

August-September flow probability curves for both Sparks and Vista have essentially the following characteristics:

1. The ability to supply the Water Quality objective flow (275 cfs at Sparks) is greatest for TROA and least for Current Conditions.

2. About forty percent of the time, Current Conditions provides about 25 cfs less than the Water Quality objective flow. This occurs because there is no Water Quality Credit storage under Current Conditions and so Truckee flow is the flow that results from operations that have no water quality objective.

3. About 50% of the time, all alternatives provide Truckee flow that is greater than the Water Quality objective flow (275 cfs at Sparks). During these periods, TROA flows tend to be the least, due to TROA's greater ability to establish Credit Water storage (and thus reduce Truckee River flow). During these periods, Current Conditions flows tend to be the greatest, to a considerable extent, because there is no Credit Water storage establishment for the Current Conditions analysis.

Truckee River Inflow to Pyramid Lake

Operations for fishery purposes in the lower Truckee are based upon six sets of target (monthly) inflows to Pyramid Lake. The set (regime) with the greatest target inflows is intended to provide good fishery biological conditions throughout the year and the set (regime) with the lowest target inflows is intended to only provide some maintenance of biological activity but be much less than required for maintenance of a desirable fish habitat. (Note biological characterization of flows and flow regimes is Sierra Hydrotech's and may not be one that would be used by fishery biologists.)

October-January flow probability curves for the Truckee River at Nixon have characteristics that are similar to those of the Truckee at Vista. Except for wet months (that occur less than 15% of the time), TROA flows are generally less than or equal to those of other alternatives and during the lowest flow months (about 30% of the time), all alternatives have similar flows. The maximum target inflow during October through January is 160 cfs. As the flow probability plots indicate, all alternatives have essentially the same flow versus probability relationship for Pyramid inflows in the range between zero and 160 cfs.

When Pyramid inflow is between about 160 cfs and 700 cfs, TROA is likely to have lower inflow than other alternatives. This occurs because, when there is an opportunity to establish Credit Water storage and exercise of that opportunity will not impair the Pyramid inflow (as set by the target inflow) then TROA operation will normally use that opportunity to establish Credit Water storage.

The following tabulation indicates the probability that months during October through January have Pyramid Lake inflow that equals or exceeds the target flows associated with Regimes one through five. These five flow regimes provide flows that are greater than the minimum required just to provide maintenance of biological activity in the lower Truckee River.

	Percent of Time Regime Target Flow Provided
Current Conditions	
Regime No. 1	73
Regime No. 3 or Better	78
Regime No. 5 or Better	87
No Action	
Regime No. 1	74
Regime No. 3 or Better	78
Regime No. 5 or Better	87

Local Water Supply	
Regime No. 1	74
Regime No. 3 or Better	78
Regime No. 5 or Better	86

TROA	
Regime No. 1	72
Regime No. 3 or Better	76
Regime No. 5 or Better	86

February-March flow probability curves are nearly the same for all three operations. TROA operation provides slightly more water under low flow conditions because TROA has a larger supply with which to supplement other flows. TROA operation provides slightly less water under mid-range flow conditions because TROA has more opportunity to store surplus Truckee flow. And, when flows are high, TROA operation will experience greater reservoir spill, as discussed above for Sparks and Vista, and consequently tends to provide greater Pyramid inflow than other alternatives.

April-July flow probability curves are nearly the same for all alternatives. TROA tends to provide slightly more inflow during extreme low flows because the TROA alternative tends to have more water available from reservoir storage. Also, TROA tends to have greater inflow during high flow periods because of the greater reservoir spill under TROA conditions. It might be noted that at almost every Pyramid inflow target, there tends to be a step in the flow-probability plots.

August-September flow probability curves indicate that the Current Conditions alternative has a tendency to have lower inflow to Pyramid Lake than do the other alternatives.

As the "steps" in the flow probability curves indicate, much of the August-September operation is controlled by the target flow criteria. There is about a 10 % chance that Current Conditions will have greater inflow than other alternatives. This is due to the smaller ability to hold water in storage under Current Conditions.

It might be noted that the "steps" occurring at flows equal to about 250 cfs for Current Conditions and about 270 cfs for the other alternatives do not correspond to target flow criteria. These flows result from other operation criteria associated with the alternatives and with the water development assumptions associated with the alternatives.